

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

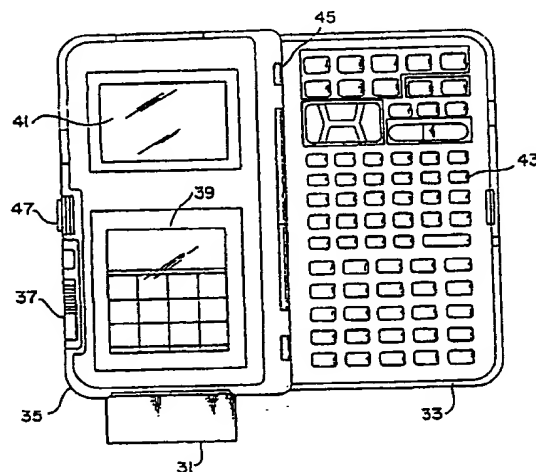
(11) Publication number:

0 427 289 A2

(12)

EUROPEAN PATENT APPLICATION(21) Application number: **90121490.8**(51) Int. Cl.5: **G06F 15/02**(22) Date of filing: **09.11.90**(30) Priority: **09.11.89 US 435209**(43) Date of publication of application:
15.05.91 Bulletin 91/20(64) Designated Contracting States:
DE FR GB(71) Applicant: **SHARP KABUSHIKI KAISHA**
22-22 Nagaike-cho Abeno-ku
Osaka 545(JP)(72) Inventor: **Hsieh, William**
66 S. Franklin Turnpike No. 56
Ramsey, New Jersey 07446(US)(74) Representative: **TER MEER - MÜLLER -**
STEINMEISTER & PARTNER
Mauerkircherstrasse 45
W-8000 München 80(DE)(54) **Portable electronic financial calculator and planner.**

(57) A portable electronic financial calculator and planner displays all the variables associated with the financial problem to be calculated on one screen (41) to enable the user to more efficiently input numeric information corresponding to the various variables of the desired financial calculation. To display all the variables in common English terms, the portable financial calculator and planner has separated the financial problems into separate applications which enables this device to display variables distinct to the selected problem. This portable financial calculator and planner includes a display panel having at least eight lines of multi-digit display units. The portable electronic financial calculator and planner also has an input device (31) which allows the operator to input numeric information into the fields corresponding to the known variables of the financial problem by allowing the user to utilize a movable cursor which is capable of moving from field to field. This input device also includes an answer request symbol to allow the user to assign one variable of the financial problem as the unknown variable to be determined. By displaying all the variables on one screen (41) and allowing the user to input numeric information into any field associated with the variables of the financial problem through the use of a cursor, the portable electronic financial calculator and planner allows the user to operate it without extensive training.

*FIG. 4***EP 0 427 289 A2**

PORTABLE ELECTRONIC FINANCIAL CALCULATOR AND PLANNER

The present invention relates to a portable electronic financial calculator and planner, and more specifically, to a portable electronic financial calculator and planner which is capable of displaying the information needed to calculate the desired financial function or problem such that the displayed information is readily recognizable to an every day consumer.

BACKGROUND OF THE PRESENT INVENTION

Presently, many business, real estate, and professional people utilize preprinted rate tables to assist in calculating loan payments, the amount to lend or borrow, or compare various offers from different financial institutions. On the other hand, many business, real estate and professional people utilize financial calculators to solve these various problems.

The advantage in utilizing the rate tables is the low cost of obtaining these rate tables from the financial institutions. However, there are also disadvantages associated with these rate tables. One disadvantage associated with the rate table is the consumption of time needed to obtain the information from the rate table. For example, to find the payment for a loan for a certain interest rate and payout period, one has to look up on the rate table for the payment associated the known interest rate and payout period and multiply the amount found in the rate table by the actual amount of the loan and divide this product by a thousand to get the actual monthly payment. Another disadvantage is that the rate tables are not precise because one rate table cannot possibly list all the possible combinations of rates and payout periods that a user may desire and thus, a user cannot always get the exact answer desired.

To overcome these disadvantages of the rate tables, financial calculators have been developed. However, these financial calculators have various disadvantages. One of the disadvantages is that the present financial calculators are difficult to use because these financial calculators require the user to modify the desired financial problem to meet the various specifications of the financial calculator and planner. To modify the problem to the specifics of the financial calculator and planner, the user usually has to go through a lengthy period of training before the actual use of the calculator. Moreover, the present financial calculators only display on variable of the problem at a time, thereby causing the user to possibly lose track of which variables of

the problem have already been entered. Because these financial calculators do not display all the variables for the particular problem on the screen at one time, the user of the financial calculator and planner usually has to write down the various variables as the numerical information is being entered upon the financial calculator and planner, thereby also requiring the user to have a writing utensil and recording medium along with the financial calculator and planner.

SUMMARY OF THE PRESENT INVENTION

In realizing the various disadvantages of the prior art devices, the present invention utilizes a portable electronic financial calculator and planner which is capable of overcoming the various disadvantages of the prior art. The present invention provides an easy-to-use portable electronic financial calculator and planner that allows the user to choose a specific financial problem. By allowing the user to choose a specific financial problem, the present invention is capable of displaying all the questions or variables associated with the financial problem to be solved in commonly used English terms such that the user may be able to utilize the present invention without referring to a manual or attending a lengthy training process. By displaying all the variables at once, the user merely has to input the known information corresponding to the variables of the financial problem without regard to sign notation and actuate a solve key upon completion of this inputting process.

The present invention then calculates the results of the variable having no inputted information associated with it. Also, the present invention allows the user to utilize this electronic financial calculator and planner without the need to use any other tools such as a pencil, paper, or lengthy manual. For example, the user of the present invention need not use a pencil or paper to keep track of the data being entered into the present invention because all the variables associated with the desired financial problem appear simultaneously on one screen, and upon actuation of a help key, the present invention informs the user of the needed information to carry out the financial problem, thereby eliminating the need for a lengthy manual.

To realize these advantages, one preferred embodiment of the present invention breaks up the financial categories into various financial problems and assigns each financial problem to a single key input to be chosen or activated by the user. This

preferred embodiment includes a display panel capable of displaying all the variables associated with the chosen financial problem. This embodiment also includes an input device which allows the user to input numeric information into the various fields associated with the displayed variables through the use of an user controlled movable cursor, as well as, the financial problem to be solved. The input device also allows the user to input an answer request symbol into the field associated with the variable that is unknown, i.e., desired to be known.

In another preferred embodiment of the present invention, the portable electronic financial calculator and planner utilizes a method which determines the financial function to be carried and displays upon a display screen all the variables associated with the selected financial function. This method also allows the portable electronic financial calculator and planner to receive numeric information from a user through the use of numeric keypads and an user controlled movable cursor. In carrying out this method, the portable electronic financial calculator and planner solves for the variable having no assigned numeric value and displays all the variables and the associated numeric values for the user to view upon completing of the financial calculations.

OBJECTS OF THE PRESENT INVENTION

It is therefore an object of the present invention to provide a portable electronic financial calculator and planner which is capable of helping a user solve financial problems relating to loans, annuities, savings, and the like.

It is another object of the present invention to provide a portable electronic financial calculator and planner which is capable of solving financial problems relating to loans, annuities, savings, and the like in a quick and accurate manner.

It is a further object of the present invention to provide a portable electronic financial calculator and planner which allows the user to solve financial problems relating to loans, annuities, savings, and the like, without the user having to utilize other tools such as pencils, paper, or lengthy manuals.

It is still a further object of the present invention to provide a portable electronic financial calculator and planner which allows the user to solve financial problems relating to loans, annuity, savings, and the like, without the user going through a lengthy period of training before the actual use of the portable electronic financial calculator and planner.

It is still a further object of the present invention to provide a portable electronic financial calculator and planner which breaks out financial

problems into separate financial application problems that can be chosen by an user so that only variables associated with the chosen financial problems will be displayed.

It is still a further object of the present invention to provide a portable electronic financial calculator and planner which displays all the variables involved in solving financial problems relating to loans, annuities, savings, and the like.

It is still a further object of the present invention to provide a portable electronic financial calculator and planner which displays the inputted information along with the represented variables simultaneously with the desired result and associated variable.

These and further objects of the present invention will become more readily apparent from a better understanding of the preferred embodiments described below with reference to the following drawing Figures.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description given below and the accompanying drawings which are given by way of illustration only and are not intended to limit the present invention, and wherein:

Fig. 1 illustrates one embodiment of the present invention;

Fig. 2 illustrates the layout of the keyboard of the embodiment illustrated in Fig. 1;

Fig. 3 illustrates a block diagram of the circuit utilized in the present invention;

Fig. 4 illustrates another preferred embodiment of the present invention;

Fig. 5 illustrates a detachable keyboard and memory for the preferred embodiment illustrated in Fig. 4;

Fig. 6(a) illustrates an example of the display shown on the display screen when the present invention is in the loan and annuity mode;

Fig. 6(b) is an example of the display shown on the display screen when the present invention is in the savings mode;

Fig. 6(c) is an example of the display shown on the display screen when the present invention is in the rate versus yield mode;

Fig. 6(d) is an example of the display shown on the display screen when the present invention is in the bond mode; and

Figures 7(a) through 7(e) illustrate the flowchart of the process carried out by the present invention.

The above-mentioned drawings will be described in detail in the following detailed descrip-

clock 17, a ROM 21, and a RAM 23. In Fig. 3, a keyboard 19 is utilized to input information into a central processing unit 15. The central processing unit 15 is connected to the clock 17, the ROM 21, and the RAM 23. The clock 17 provides clock pulses to the CPU 15 to assist the CPU 15 in carrying out the instructions necessary to solve the financial problems selected by the present invention. The mathematical relationships utilized by the CPU 15 to solve the financial problems selected by the present invention are stored in the ROM 21. Also, the numeric information utilized in the calculations of the CPU 15 are inputted through the keyboard 19 and temporarily stored in the RAM 23. The CPU 15 is also connected to the liquid crystal display controller 13 to supply the liquid crystal display controller 13 with the information to be displayed on the liquid crystal display device.

Fig. 4 illustrates another preferred embodiment of the present invention. In this preferred embodiment of the present invention, the portable electronic financial calculator and planner is divided into first and second sides, 33 and 35, respectively. These two sides 33 and 35 are attached by a hinge 45 which allows sides 35 and 33 to overlay each other in a closed position while being carried or transported. The two sides 33 and 35 respectively, are locked together in the closed position through a locking mechanism 47.

The first side 33 includes a keyboard 43 which allows the user to input the needed information in response to the inquiries or inferences generated by the selected financial problem. The second side 35 includes a display screen 41 for displaying all the variables and numeric information associated with the selected financial problem. The second side 35 also includes a receiving portion 39 for receiving an integrated circuit memory card 31 associated with the money planner functions. This integrated circuit card 31 is shown in more detail in Fig. 5. Upon receiving the integrated circuit card 31 in the receiving portion 39, a locking device 37 locks the integrated circuit card into its proper position within the receiving portion 39. However, this electronic apparatus will be capable of operating other functions properly (i.e., calculator functions and the like) if the integrated circuit card 31 is not properly locked in position within the receiving portion 39. The position of the integrated circuit card 31 will only affect the performing of the financial calculations.

Fig. 5 is a detailed drawing of the integrated circuit card 31 utilized in the preferred embodiment of Fig. 4. This integrated circuit card 31 includes memory; i.e., a ROM; for storing the mathematical relationships associated with the designated financial functions of the present invention and a keyboard for inputting instructions into the electronic

apparatus in Fig. 4 which are used to carry out the functions of the portable electronic financial calculator and planner of the present invention. The keyboard of the integrated circuit card 31 includes keys representing the operational modes of loans and annuities; savings; rates versus yield; bonds; investment analysis; money planning; depreciation status; and a mode which allows equations to be inputted by the user. Upon activation of one of these keys, the display screen 41 of Fig. 4 will display all the variables associated with this financial problem. The integrated circuit card 31 also contains various instruction keys which are similar to those described with respect to Fig. 2, such as store, recall, help, etc.

Figs. 6(a) through 6(d) illustrate examples of the displays shown on the display screen upon the selection of some of the various financial problems or operational modes. For example, Fig. 6(a) illustrates an example of the display showing the various variables associated with the loan and annuities financial problem. Fig. 6(b) shows an example of the various variables shown on the display device upon the actuation of the savings financial problem. Fig. 6(c) illustrates an example of the various variables shown on the display device upon selecting the rates versus yield function. Lastly, Fig. 6(d) demonstrates an example of the displaying of the various variables upon selection of the bond financial problem.

As can be seen from Figure 6(a) through 6(d), by separating the financial problem into separate applications; i.e., loan and annuities, savings, rates versus yield, and bond; the present invention is capable of displaying variables in common English terms which are distinct to the chosen problem. This combination of separating the financial problems into distinct applications and displaying all the associated variables of the present invention avoids the confusion inherent in the conventional devices which display the same general variables in non-common English terms for all the different financial problems. For example, in the conventional devices, "PV" can represent the amount of a loan in a loan problem or the present amount in a savings problem. To understand the meaning of "PV", one needs to take extensive training courses or read lengthy manuals. On the other hand, in the present invention, as shown in Figures 6(a) through 6(d), the variables are displayed in common English terms, such as, "loan amount" instead of "PV" for a loan problem, etc.

Figs. 7(a) through 7(e) illustrate the flowchart that shows the process carried out by the preferred embodiments of the present invention. In Fig. 7(a), at step 50, the present invention determines whether the ON/OFF switch has been activation. Upon actuation of the ON switch, the present invention

89, the present invention determines whether the eighth key K8 of Fig. 2, has been activated at step 92. If the eighth key K8 has been activated at step 92, the present invention stores the number in the field associated with the present position of the cursor at step 93 and determines whether the cursor is in the frequency field at step 94. If the cursor is in the frequency field at step 94, the present invention displays the previous frequency value at step 95 before returning to step 54. However, if the cursor is not in the frequency field if the display at step 94, the process of the present invention returns to step 54. In other words, if the present invention determines that the cursor is in the frequency field, the present invention displays the previous frequency value and returns to step 54. The frequency values in the preferred embodiment of the present invention are listed in the following sequential order: annual, semi-annual, quarterly, monthly, semi-monthly, bi-weekly, weekly, and daily.

If the present invention determines at step 92 that the eighth key K8 has not been activated, the present invention determines whether the ninth key K9 of Fig. 2, has been activated at step 96. If the ninth key K9 has been activated at step 96, the present invention stores the number in the field associated with the present position of the cursor at step 97 and determines whether the cursor is in the frequency field at step 98. If the cursor is in the frequency field at step 98, the present invention displays the subsequent frequency value at step 99 before returning to step 54. However, if the cursor is not in the frequency field of the display at step 98, the process of the present invention returns to step 54. In other words, if the present invention determines that the cursor is in the frequency field, the present invention displays the subsequent frequency value and returns to step 54. The frequency values in the preferred embodiment of the present invention are listed in the following sequential order: annual, semi-annual, quarterly, monthly, semi-monthly, bi-weekly, weekly, and daily.

If the present invention has determined at step 96 that the ninth key K9 has not been activated, the present invention determines at step 100 whether the eleventh key K11 has been activated. If the eleventh key K11 has been activated at step 100, the present invention stores the numeric information contained in the field related to the present position of the cursor in memory before returning to step 54. If at step 100, the eleventh key K11 has not been activated, the present invention determines at step 102 whether the twelfth key K12 of Fig. 2 has been activated. If the twelfth key K12 has been activated at step 102, the present invention retrieves the number stored in memory and places it in the field corresponding to the

present position of the cursor at step 103 before returning to step 54.

However, if at step 102, the present invention determines that the twelfth key K12 has not been activated, the present invention determines at step 104 whether one of the numeric keypads has been activated at step 104. If one of the various numeric keypads have been activated at step 104, the present invention pushes the existing numerals within the field associated with the present position of the cursor to the left by one position and places the new activated numeral in the rightmost digital position at step 105 before returning to step 54.

In Fig. 7(d), if the present invention at step 104 determines that no numeric keypad has been activated, the present invention determines whether the clear entry key K14 of Fig. 2 has been activated at step 106. If the clear entry key K14 has been activated at step 106, the present invention determines whether the current field has been previously cleared of its numeric information corresponding to the present position of the cursor at step 107. If the current field has been cleared at step 107, the present invention initializes all the fields of the present display at step 130 before returning to step 54. However, if the current field has not been cleared at step 107, the present display clears the field corresponding to the present position of the cursor at step 131 before returning to step 54. If at step 106, it is determined that the clear entry key K14 has not been activated, the present invention determines whether the fifteenth key K15 of Fig. 2 has been activated at step 108. If the fifteenth key K15 has been activated at step 108, the present invention clears the rightmost digit within the field corresponding to the present position of the cursor and pushes the remaining numerals in this field to the right by one position at step 109 before returning to step 54. However, if it is determined at step 108 that the fifteenth key K15 has not been activated, the present invention determines at step 110 whether a mathematical operator key has been actuated. If a mathematical operator key has been actuated at step 110, the present invention sets up the mathematical operation of step 111 prior to returning to step 54. If no mathematical operator key has been actuated at step 110, the present invention determines whether the equals key K16 of Fig. 2, has been actuated at step 112. If the equals key K16 has been actuated at step 112, the present invention performs the mathematical operation previously inputted at step 110 and places the result of this mathematical operation in the register corresponding to the current position of the cursor of the display screen at step 113 before returning to step 54.

However, if it has been determined that the

and assigns the result of this mathematical operation to the variable associated with the position of the cursor. The user may also input the answer request symbol, "?", into the field associated with the present position of the cursor by activating the fifth key K5 of Fig. 2, or its corresponding key on the integrated circuit board 31 of Fig. 5. By inputting this answer request symbol into the field associated with the present position of the cursor, the present invention is informed that the variable associated with the present position of the cursor is to be an unknown variable in the calculations of the financial problem. Upon entering numeric values for all the fields associated with the financial problem, except the one field having been assigned to the answer request symbol, the user merely activates the "solve" key, sixth key K6 of Fig. 2, or the associated key on the integrated circuit card 31 of Fig. 5, to obtain the desired result of the financial problem. If the user has failed to assign only one field with the answer request symbol or the user has failed to assign a field with the answer request symbol, upon activating the solve key, the user will receive an error message indicating to the user that either an answer request symbol has not been presented or that the user has not presented enough numeric information to calculate the desired result.

If the user desires to calculate a financial problem corresponding to savings, rate versus yield, or bonds, the user merely activates one of the second through fourth keys K2 through K4, of Fig. 2 or the corresponding keys situated on the integrated circuit card 31 of Fig. 5. If the savings key is activated, the display screen 3 of Fig. 1 or the display screen 41 of Fig. 4 will display a format as shown in Fig. 6(b), except for the numeric values shown in Fig. 6(b). If the user is to activate the rate versus yield key, the display screen 3 of Fig. 1 or the display screen 41 of Fig. 4 will show the format demonstrated in Fig. 6(c), except for the numeric values shown. However, if the user selects the bonds key, the display 3 of Fig. 1 or the display 41 of Fig. 4 will show a format as illustrated in Fig. 6(d), except for the numeric values. The present invention also displays on the display screen 41 of Fig. 4, a similar format should the user activate one of the keypads, investment analysis, money planning, depreciation status, or "your equations" that are situated on the integrated circuit card 31 of Fig. 5. More specifically, the display screen 41 of Fig. 4 will display all the variables related to the selected operational mode or financial problem. The entering of information or numeric values with respect to these various other financial modes are similar to the entering of information described above with respect to the loans and annuities financial mode.

The present invention described above with

reference to the accompanying drawings describes various preferred embodiments of the portable electronic financial calculator and planner constructed in accordance with the teachings of the present invention. It should be understood, however, that one of ordinary skill in the art could construct a variety of portable electronic financial calculators in accordance with the teachings of the present invention. It should, therefore, be understood that the present invention is not limited by the above-described preferred embodiments. The present invention is defined by the claims appended hereto, which are intended solely to define the present invention, including such changes and modifications that would occur to one of ordinary skill in the art within the spirit and scope of the appended claims.

Claims

1. A handheld electronic apparatus for calculating financial information comprising:
 - display panel means for displaying inquiries related to a desired calculation and including at least eight lines of multi-digit display units;
 - input means, operatively connected to said display panel means, for inputting numeric information into fields corresponding to at least three lines of said multi-digit display units and for inputting an answer request symbol in one line of said multi-digit display units;
 - memory means, operatively connected to said input means, for storing said numeric information inputted by said input means such that individual stored numeric information corresponds to a distinct variable, for storing said answer request symbol at a certain memory location indicating that an unknown variable is associated with said certain memory location, and for storing a mathematical relationship, said mathematical relationship demonstrating a relationship between the stored numeric information and said unknown variable;
 - calculating means, operatively connected to said memory means, for calculating a result using said mathematical relationship corresponding to said unknown variable; and
 - output means, operatively connected to said calculating means and said display panel means, for replacing said answer request symbol on said display panel means with said result from said calculating means.
2. The handheld electronic apparatus as claimed in claim 1, wherein said numeric information is inputted and displayed as positive numbers.
3. The handheld electronic apparatus as claimed in claim 1, further comprising:
 - field calculating means, operatively connected to

said input means and said memory means, for calculating a field result from the numeric information inputted within the field using mathematical instructions inputted by said input means; said memory means storing said field result such that said field result corresponds to a distinct variable.

4. The handheld electronic apparatus as claimed in claim 1, further comprising:

cursor means, operatively connected to said input means and said memory means for applying said numeric information in a field to said memory means to be stored when a cursor leaves the field and enters a new field.

5. The handheld electronic apparatus as claimed in claim 1, wherein said inquiries are displayed in common English terms relevant to the desired calculation.

6. The handheld electronic apparatus as claimed in claim 1, further comprising:

help means, operatively connected to said input means, for displaying information or instructions related to a chosen calculation or chosen inquiry.

7. A handheld electronic apparatus for calculating financial information comprising:

display means for displaying inquiries related to a desired financial calculation;

said display means including at least eight lines of multi-digit display units;

input means, operatively connected to said display means, for inputting numeric information into fields corresponding to at least three lines of said multi-digit display units;

detachable input means, operatively connected to said display means, for inputting a desired financial calculation function and for inputting an answer request symbol in one line of said multi-digit display units;

memory means, operatively connected to said input means, for storing said numeric information inputted by said input means such that individual stored numeric information corresponds to a distinct variable and for storing said answer request symbol at a certain memory location indicating that an unknown variable is associated with said certain memory location;

detachable memory means, operatively connected to said detachable input means, for storing a mathematical relationship corresponding to said desired financial calculation function;

said detachable input means causing said memory means to also store said mathematical relationship; calculating means, operatively connected to said memory means and said detachable input means, for calculating a result using said mathematical relationship; and

output means, operatively connected to said calculating means and said display means, for replac-

ing said answer request symbol on said display means with said result from said calculator means.

8. The handheld electronic apparatus as claimed in claim 7, wherein said display means displaying said inquiries simultaneously.

9. The handheld electronic apparatus as claimed in claim 7, wherein said display means displaying said inquiries on lines of multi-digit display units distinct from lines of multi-digit display units displaying said numeric information or said answer request symbol.

10. The handheld electronic apparatus as claimed in claim 7, further comprising:

field calculating means, operatively connected to said input means and said memory means, for calculating a field result from the numeric information inputted within the field using mathematical instructions inputted by said input means; said memory means storing said field result such that said field result corresponds to a distinct variable.

11. The handheld electronic apparatus as claimed in claim 7, further comprising:

cursor means, operatively connected to said input means and said memory means for applying said numeric information in a field to in said memory means to be stored in said memory means when a cursor leaves the field and enters a new field.

12. The handheld electronic apparatus as claimed in claim 7, wherein said inquiries are displayed in common English terms relevant to the desired calculation.

13. The handheld electronic apparatus as claimed in claim 7, further comprising:

help means, operatively connected to said input means, for displaying information or instructions related to a chosen calculation or chosen inquiry.

14. A method for calculation financial information utilizing a handheld electronic apparatus, comprising the steps of:

(a) determining a financial function from a plurality of financial functions to be carried out by the electronic apparatus;

(b) generating and displaying inferences on a display device associated with information needed to carry out the financial function determined;

(c) receiving information through an input device in response to said inferences generated;

(d) determining if the said information received for an individual inference is an answer request symbol;

(e) storing said information received for an individual inference in a distinct memory location upon determining that the received information is not an answer request symbol;

(f) assigning an unknown variable to an individual inference in a distinct memory location upon determining that the received information is an

answer request symbol; and

(g) calculating a value for the unknown variable using a relationship associated with said determined financial function; and

(h) displaying on the display device said calculated value along with said stored information and said inferences.

5

15. The method as claimed in claim 14, wherein receiving said information in response to said inferences, comprises the steps of:

10

(i) receiving numeric information through the input device;

(j) receiving a mathematical instruction relating to the said numeric information received;

(k) calculating a field result from the numeric information and the said mathematical instruction; and

15

(l) storing the said field result as the said received information responsive to said inferences generated.

20

16. The method as claimed in claim 14, wherein all said inferences associated with the information needed to carry out a said financial function determined are simultaneously displayed

17. The method as claimed in claim 14, further comprising the steps of:

25

(i) displaying on the display device help information for each individual financial function; and

(j) displaying on the display device help information for each individual inference associated with the selected financial function.

30

35

40

45

50

55

11

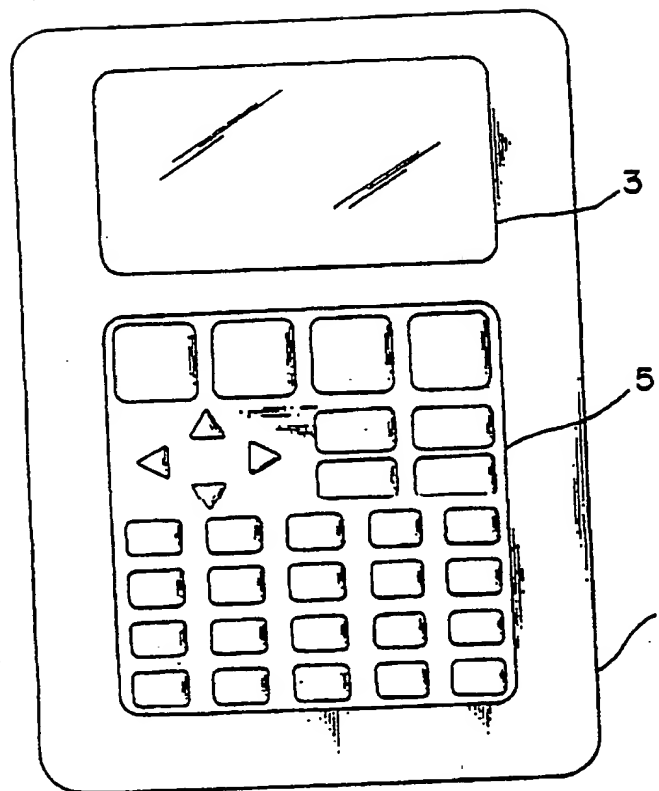


FIG. 1

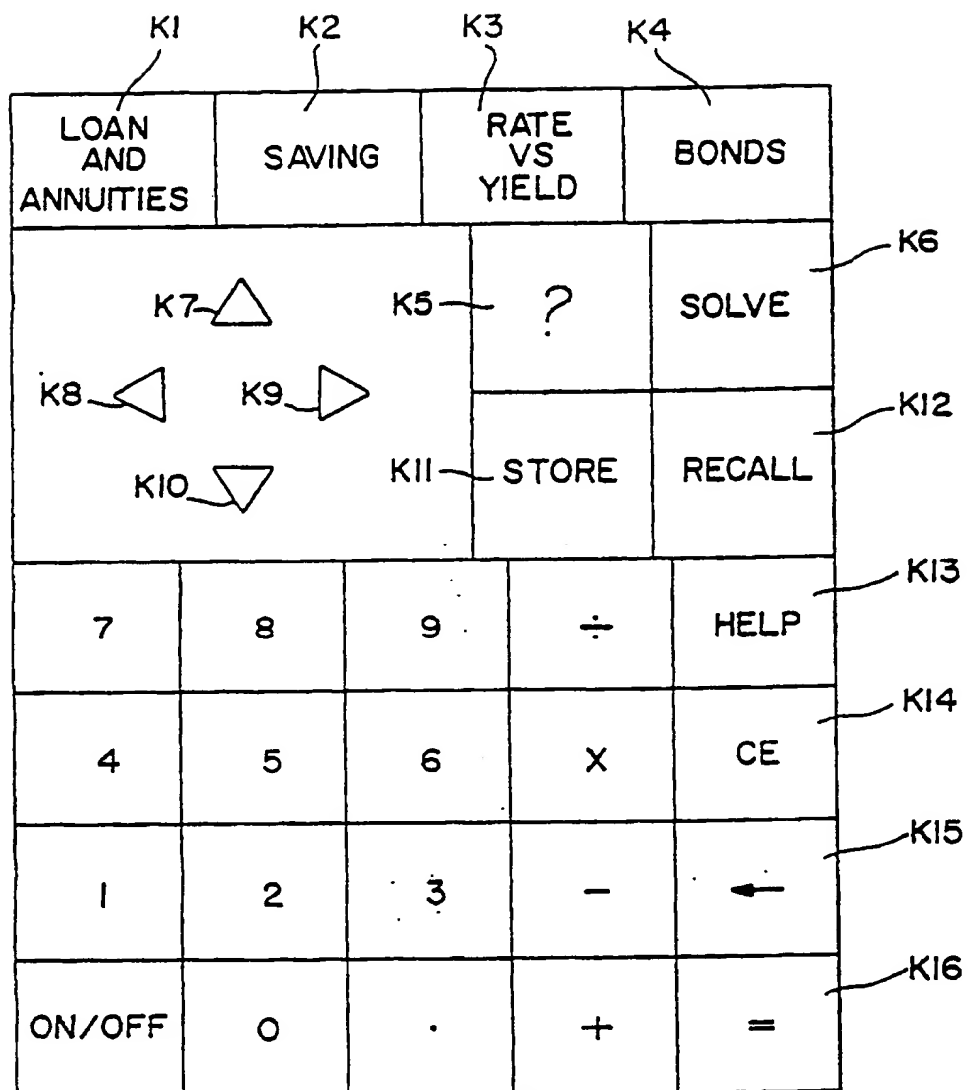


FIG. 2

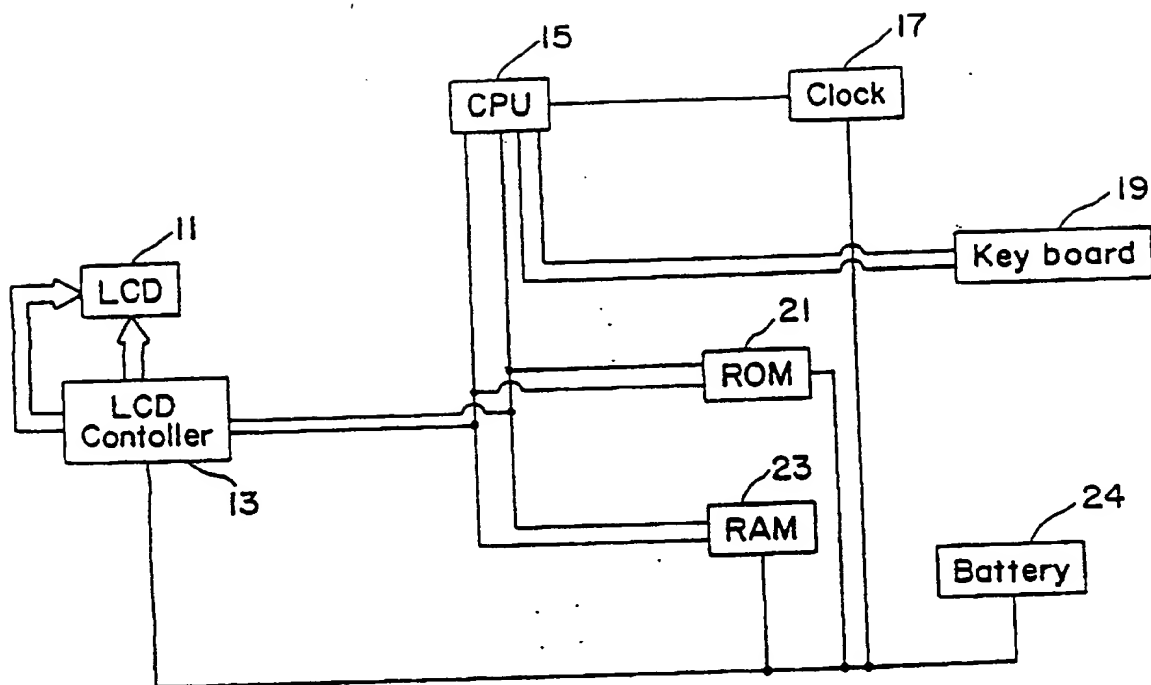


FIG. 3

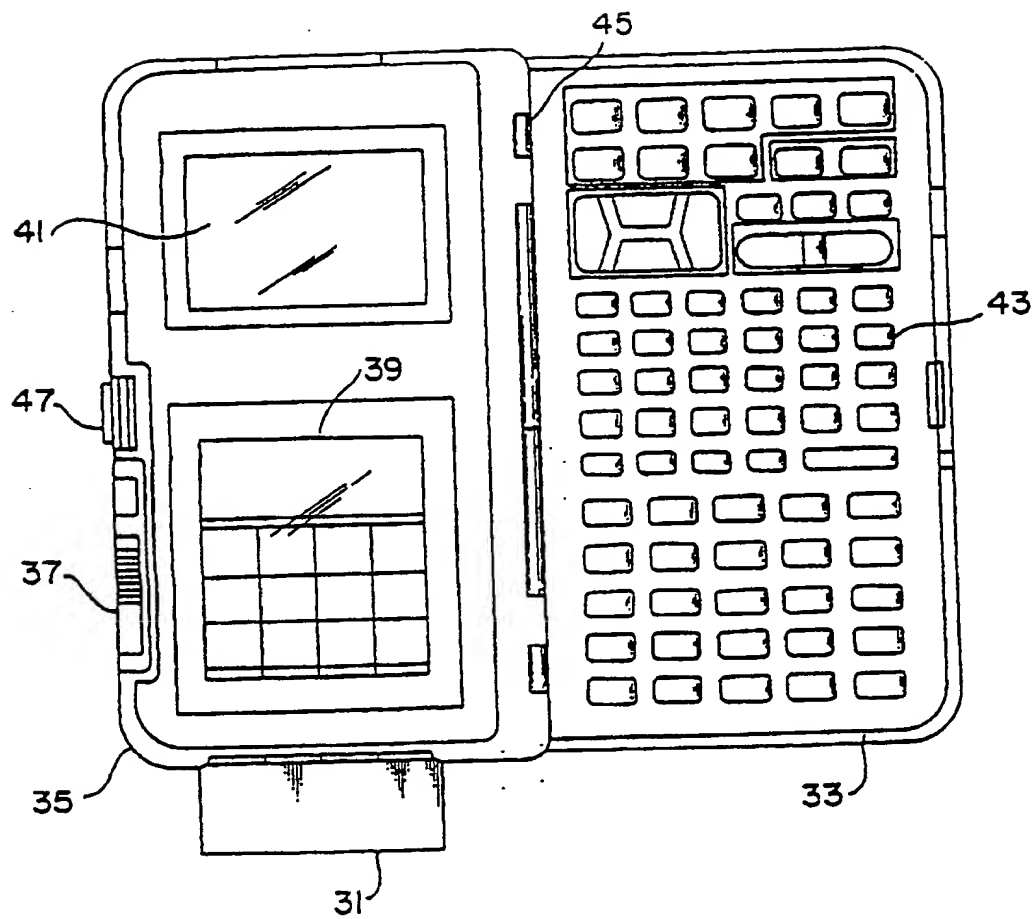


FIG. 4

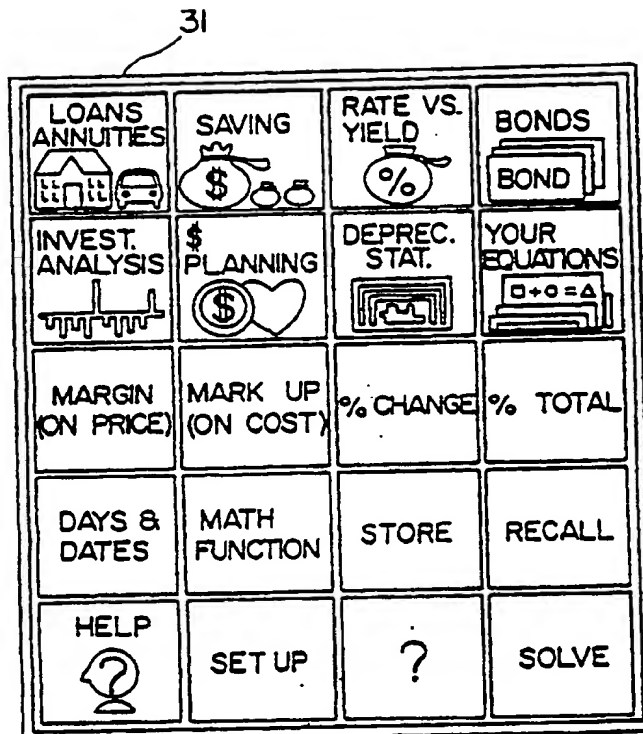


FIG. 5

AMOUNT OF LOAN	
	94,000.00
ANN RATE %	10.50
# OF PMT	360.00
(MONTHLY) PMT	
→	859.85
BALLOON PAYMENT	
	0.00

FIG. 6(a)

PRESENT BALANCE	
	5,000.00
(MONTHLY) ADD	
→	280.97
ANN RATE %	10.00
# OF YEARS	20.00
FUTURE BALANCE	
	250,000.00

FIG. 6(b)

ANNUAL	
INTEREST RATE (%)	
	18.00000000
EFFECTIVE	
YIELD (%)	
→	19.71642450

FIG. 6(c)

PRICE →	87.29
COUPONS %	7.20
PURCHASE DATE	
	10/23/90
MATURITY DATE	
	1/ 1/97
MAT VALUE	100.00
YLD TO MAT	10.00

FIG. 6(d)

FIG. 7(a)

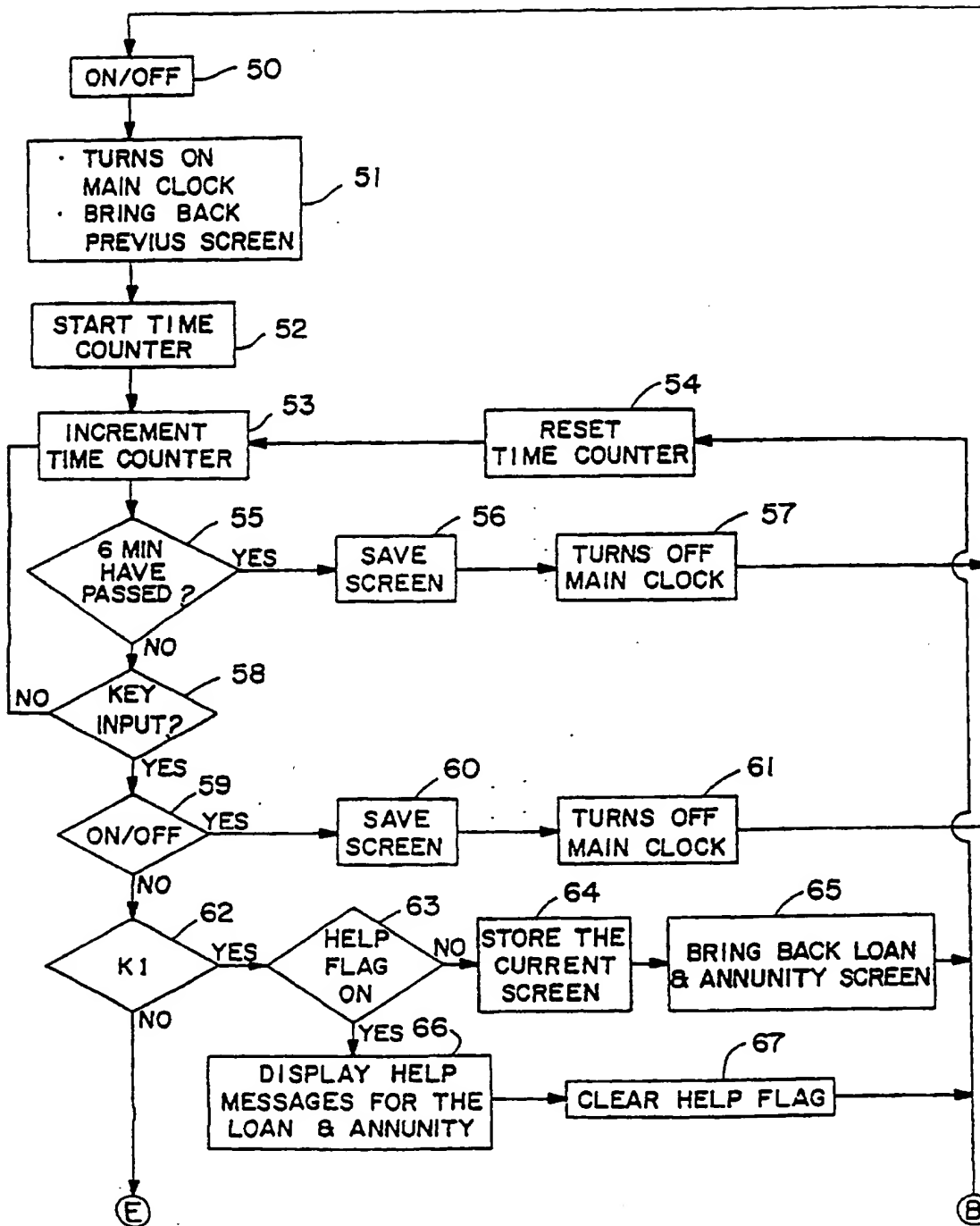


FIG. 7(b)

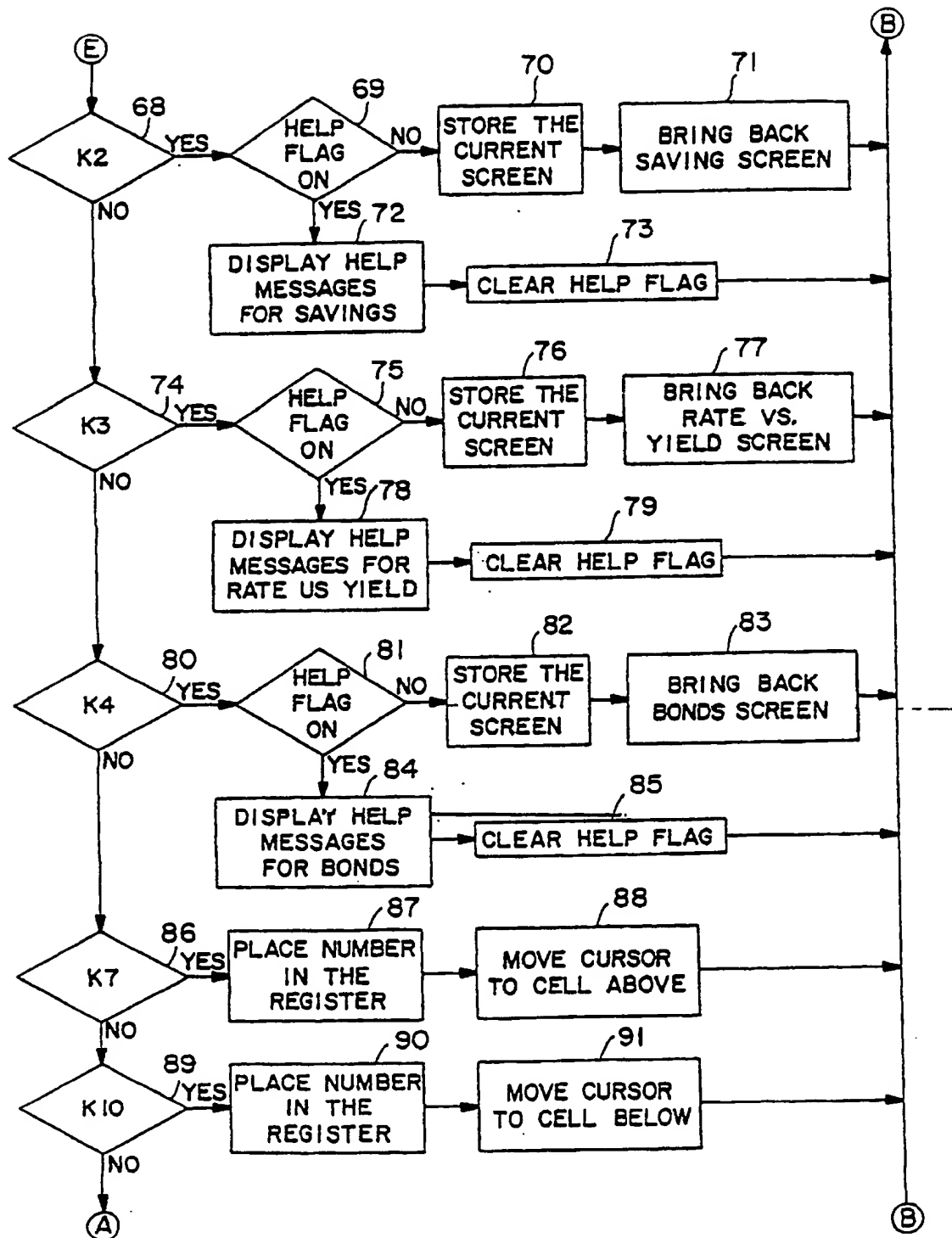


FIG. 7(c)

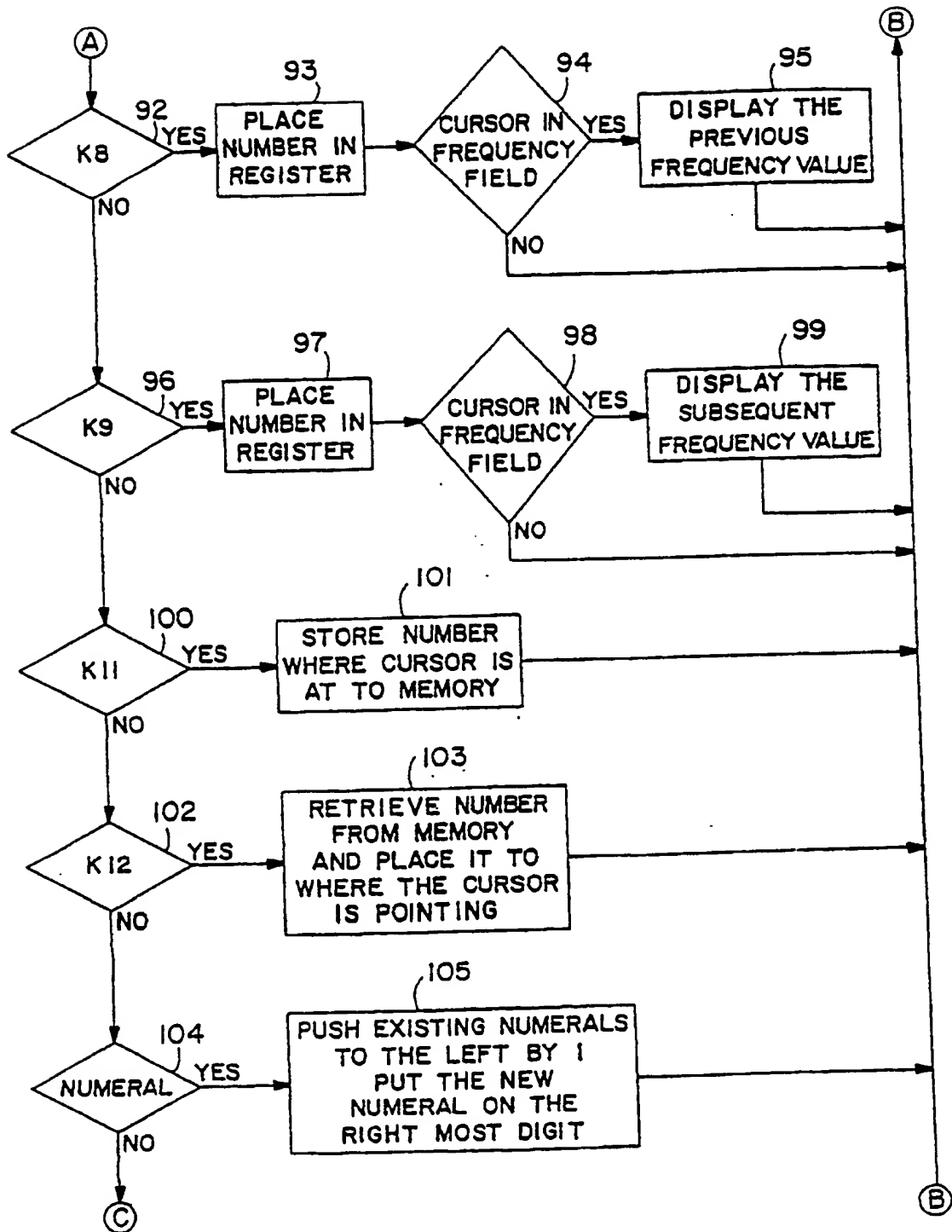


FIG. 7(d)

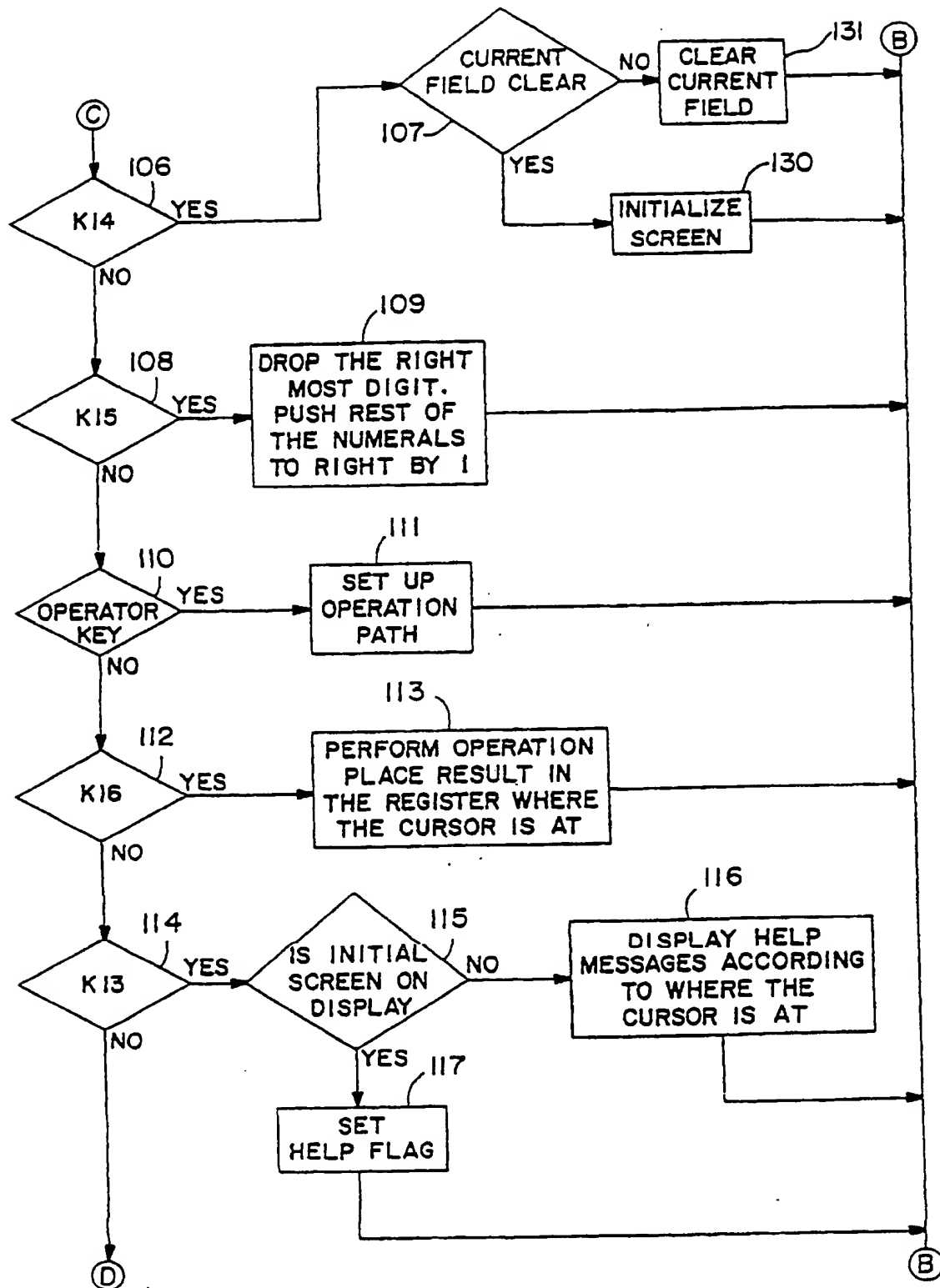


FIG. 7(e)

